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PROPOSED PLAN SEPTEMBER 2010 SITE 3 SOLID WASTE MANAGEMENT UNIT 3 (SWMU3) MCRD PARRIS ISLAND SC

9/1/2010

MCRD PARRIS ISLAND

Marine Corps Recruit Depot-Parris Island, South Carolina Site/SWMU 3 Proposed Plan - September 2010

Introduction

This document presents the proposed final remedy for Site/Solid Waste Management Unit (SWMU) 3, [also known as the Causeway Landfill] at the U.S. Marine Corps Recruit Depot, Parris Island, South Carolina (MCRD Parris Island). For the remainder of this document, this Site/SWMU will be referred to simply as Site 3. Site 3 consists of the causeway (land bridge) located in the northwestern portion of MCRD which connects Horse Island to Parris Island (see Figure 1). Site 3 once served as the primary solid waste disposal area for wastes generated at the MCRD during most of the period between 1960 and 1972.

This Proposed Plan was developed by the U.S. Department of the Navy and the U.S. Marine Corps (Navy) and approved by the U.S. Environmental Protection Agency (U.S. EPA) Region 4 and South Carolina Department of Health and Environmental Control (SCDHEC). The Navy is lead agency for this proposal in accordance with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [Title 40, Code of Federal Regulations, Part 300 et. seq.]. U.S. EPA and SCHDEC serve as support agencies in connection with this and all similar CERCLA based remedial activities at MCRD Parris Island. Representatives of the National Oceanic and Atmospheric Administration (NOAA), South Carolina Department of Natural Resources (SCDNR), and U.S. Fish and Wildlife Service (USFWS) also serve as natural resource trustees.

This document was developed in accordance with Section 117(a) of CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA), the Resource and Conservation Recovery Act (RCRA), as amended, and to the extent practicable, the NCP. This Proposed Plan highlights key information from investigations performed at Site 3 but is not a substitute for the reports that document these investigations. More detailed information regarding this Site is located in the Administrative Record for the facility.

The public is invited to review the Administrative Record and to comment on this Proposed Plan. As CERCLA lead agency, the Navy is required to publish this document to fulfill the public participation requirements of that law and the NCP. The Navy, U.S. EPA, and SCDHEC will select the final remedy for Site 3 after all public comments have been considered. The Navy, in consultation with U.S. EPA and SCDHEC, may modify the final site remedy described in this Proposed Plan or select another response action based on any new information that may become available during the public comment period.

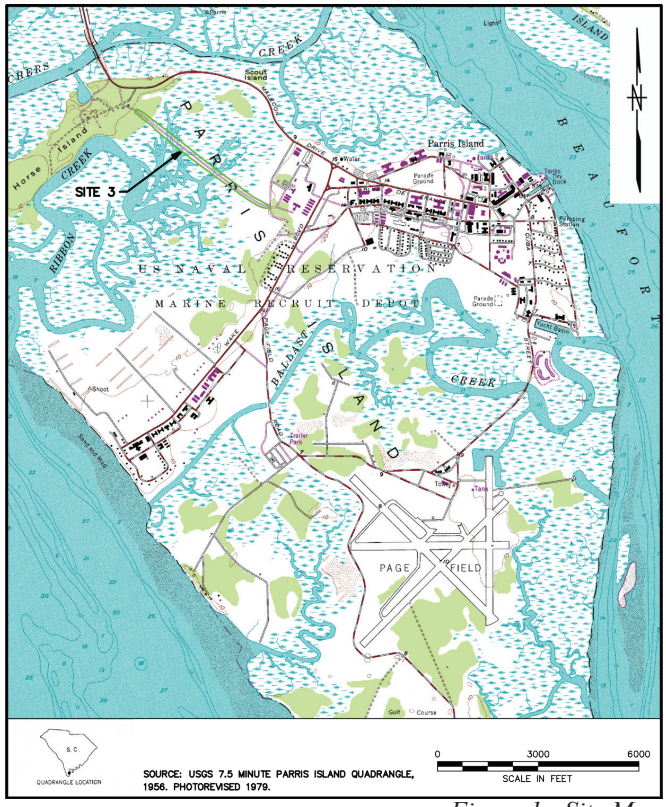

Figure 1: Site Map

Public Meeting

Meeting: **6:30 PM**

Date: **Tuesday, March 15, 2011**

Location: **Marine Corps Recruit Depot**
Religious Ministries Center
Bldg. 854 Boulevard de France
Parris Island, SC 29905

In accordance with CERCLA Section 117, this document summarizes the Proposed Plan for Site 3 at MCRD Parris Island. For more detailed information, please consult the Administrative Record File located in the information repository at the Beaufort County Public Library Headquarters (311 Scott Street, Beaufort, South Carolina 29902).

The Navy is accepting formal public comments on this Proposed Plan from February 25, 2011 to April 25, 2011. You do not have to be a technical expert to comment. If you have a concern or preference, the Partnering Team wants to hear it before making a final decision. To comment formally, you can offer oral comments during the comment portion of the public meeting (see page 12 for details) or you can send written comments, postmarked no later than April 25, 2011 to:

Commanding General
Marine Corps Recruit Depot
Attn: Lisa C. Donohoe, NREAO
P.O. Box 5028
Parris Island, SC 29905
Tel: 843-228-2779
E-mail comments by April 25, 2011 to:
lisa.donohoe@usmc.mil

AND

South Carolina Department of Health and Environmental Control
Attn: Richard Haynes, Division Director
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201
Tel: 803-896-4070
E-mail comments by April 25, 2011 to:
haynesra@dhec.sc.gov

The components of the final remedy being proposed for Site 3 are summarized below. Further details are provided in the *Scope and Role Of This Action* section of this document. The final remedy is adopting earlier actions performed under the Interim Record of Decision (IROD) along with some modifications and some new No Action determinations. Some of these components have already been fully implemented as part of an Interim Remedial Action (IRA) which was completed at Site 3 in 2001 and was preceded by a Proposed Plan for Soil Interim Remedial Action. The Proposed Plan and IROD can be found in the Administrative Record for the facility.

Site Background

The boundaries of MCRD Parris Island are shown on Figure 1. The installation serves as the recruit training facility for the U.S. Marine Corps for enlisted men from states east of the Mississippi River and for enlisted women nationwide. The facility is located along the southern coast of South Carolina, within Beaufort County, approximately 1 mile south of the City of Port Royal and 3 miles south of the City of Beaufort, and occupies an area of approximately 8,047 acres. MCRD Parris Island was added to U.S. EPA's National Priorities List (NPL) in 1994.

Site 3 is a former landfill located in the northwestern portion of MCRD Parris Island which now serves as a causeway connecting Horse Island to Parris Island. From the 1960s until 1972, the causeway was gradually constructed using layers of solid waste, fill dirt, and other debris. Site 3 functioned as the major disposal area during that period for all solid wastes discarded via dumpsters located throughout the MCRD. Wastes disposed at the site reportedly included trash with small amounts of empty pesticide containers, oily rags, spent absorbent petroleum and chlorinated solvent sludge, perchloroethylene still bottoms, mercury amalgam and beryllium waste, polychlorinated biphenyl (PCB)-contaminated oil, and metal shavings. Waste disposal practices at the site resulted in residual contamination being found in surface soils and surrounding sediments at varying concentrations.

Final Remedy Proposal Summary

- ADOPTION OF THE INTERIM REMEDIAL ACTION (IRA) AS FINAL (with slight modifications).
  - ◊ Slope Stabilization and Erosion Control (Adopted/Completed)
  - ◊ Placement of Soil Cover (Adopted/Completed)
  - ◊ Roadway Construction/Sediment Testing (Adopted/Completed)
  - ◊ Land Use Controls (LUCs) & Periodic Inspections (Adopted with Modifications)
    - o Erection of Signs (providing notice of the use restrictions)
      - ► No unauthorized intrusive activities (e.g. drinking water well installation; unauthorized groundwater extraction; soil cover penetration, etc.)
      - ► No swimming or wading
      - ► Fishing restrictions (Modified)
    - o Update Base Master Plan, GIS and EMS on LUC boundaries and land use restrictions (i.e., no residential use, etc.) (Added)
    - o Deed/lease restriction in the event of property transfer
    - o Visual inspections to verify LUCs are effectively implemented.
  - ◊ Long-Term Monitoring (Adopted with Modifications)
    - o Inspect Cover Integrity (Modified)
    - o Monitor Leachate from landfill with GW wells inside the unit boundary
- MAINTENANCE of the Soil Cover/Cap (New)
- NO ACTION for Sediments (New)
- NO ACTION for Surface Water (New)

From 1986 to 1990 several preliminary studies were conducted at Site 3 which identified the site as having the potential to pose threats to human health and/or the environment. In 1998 and 1999, the first comprehensive investigation consisting of a Remedial Investigation/Resource Conservation and Recovery Act Facility Investigation (RI/RFI), was performed that included analytical testing of surface soil, groundwater, sediment, and surface water at Site 3. A final RI/RFI report was issued by the Navy in November 1999 which summarized the nature and extent of contamination at Site 3 and characterized the risks posed to human health and the environment given known conditions at the time.

In early 2000, a Feasibility Study (FS)/Corrective Measures Study (CMS) was completed which developed and evaluated potential cleanup alternatives for the site. Based on an evaluation of site conditions, risks, and those regulatory requirements that were determined to be applicable or relevant and appropriate requirements (ARARs), remedial action objectives (RAOs) were developed. In July 2000, the Navy, U.S. EPA, and SCDHEC made available for public comment a Proposed Plan for Soil Interim Remedial Action to support the planned undertaking of the IRA to address risks posed by those wastes and contaminated surface soils, and certain areas with more highly contaminated sediments at Site 3. Those sediment areas were designated as Areas 1, 2, 3 and 4. No public comments adverse to that proposal were received.

In September 2000, the Navy, U.S. EPA, and SCDHEC issued the IROD which documented the decision to undertake the then proposed IRA for surface soils and more highly contaminated sediments in designated Areas 1, 2, 3 and 4. That IROD stipulated that follow-on actions, as necessary, would address those lesser contaminated sediments previously found adjacent to Site 3. The IRA is illustrated on Figures 2 and 3. Those actions comprising the documented interim remedy for Site 3 included placement of a soil cover, stabilization and erosion control, placement of sediment cover, application of Land Use Controls, and landfill leachate monitoring.

All IRA site construction activities were completed by July 2001. With the exception of human health risks generated by fish consumption (to be addressed by LUCs), which is related to sediments and/or surface water, the IRAs are meeting the Interim RAOs and this interim remedy is being accepted as final. More details are provided in the following sections titled *Adoption of the Interim Action as Final* and *Remedial Action Objectives*.

In late 2001 through May 2002, post-construction sediment samples were collected and analyzed to evaluate sediment conditions after completion of the IRA. From April 2003 through August 2003, a supplemental investigation was performed to further investigate sediments with elevated pesticide concentrations. The supplemental investigation determined that pesticide and metal concentrations had

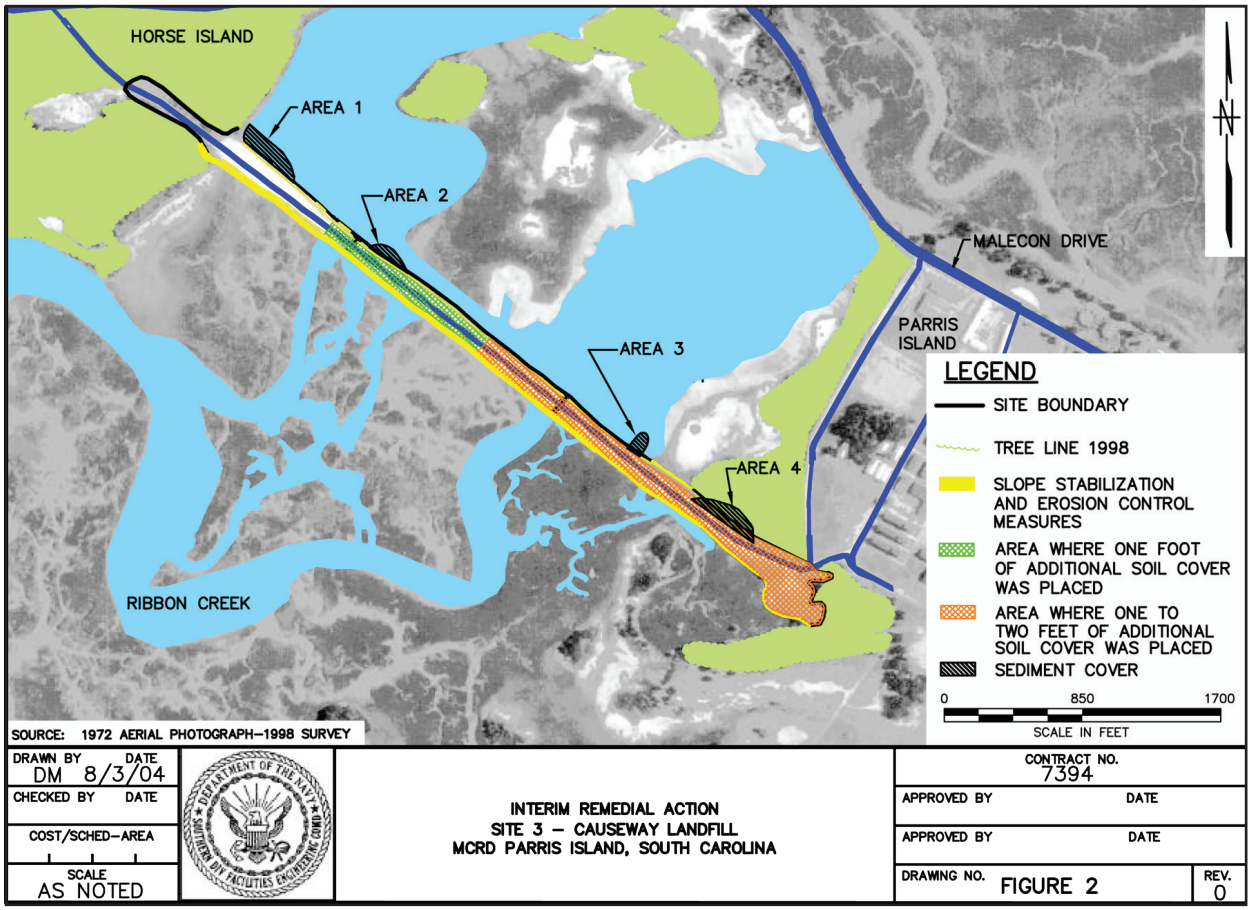

Figure 2: Interim Remedial Action

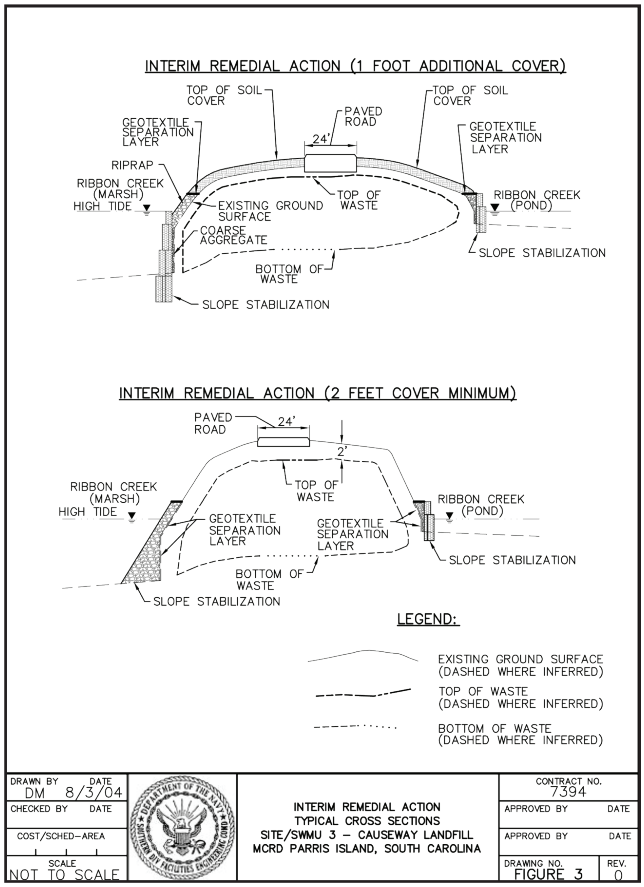

Figure 3: Interim Remedial Action Typical Cross Sections

decreased to concentrations that did not result in an unacceptable human health or ecological risk other than that generated by fish consumption (to be addressed by LUCs). Since construction was completed, some maintenance has occurred, such as the filling of small areas of erosion. In 2006, the constructed roadway capping the site was widened by several feet for the purpose of adding a bike/jogging path.

As a condition of the IROD, post-interim construction risk assessment(s) were performed on sediment. The sediment data included in the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) re-characterizations were collected in October 2001 by TtNUS and April 2003 by the U.S. EPA. Fish tissue was collected from the 3rd Battalion Pond and a reference site in October 2009 by TtNUS. The results of both the HHRA and ERA are presented in the Technical Memorandum Post-Interim Construction Risk Assessment Site 3 – Causeway Landfill (Tetra Tech, 2010). The HHRA indicated that potential risks exist to adult subsistence fishermen, child subsistence fishermen, child recreational fishermen, and U.S. EPA Region 4 default adult recreational fishermen. However, these risks are similar to, but exceed, those calculated for the local reference location. The results of the ERA indicate that negligible site-related risks to benthic invertebrates exist.

Although leachate contaminant concentrations below the landfill remain elevated, there currently is no unacceptable exposure because land use controls as part of the interim remedy restrict disturbance of the landfill cover and installation of groundwater wells. Consistent with U.S. EPA and SCDHEC policy for landfill wastes managed-in-place, the groundwater beneath the landfill will not be actively remediated; but, leachate monitoring will continue in order to evaluate landfill integrity. LUCs prohibiting any extraction of groundwater beneath the landfill will be implemented as a part of the selected remedy to ensure protection of human health and the environment.

Site Characteristics

The former gravel road at Site 3, which was constructed upon the solid wastes, fill dirt, and debris that was deposited at the site until 1972, is now an asphalt, two-lane road with an adjacent bike/jogging path. There are no buildings or other major physical improvements on the site. Geographically, this causeway connects Horse Island and Parris Island by cutting across Ribbon Creek and tidal marshes associated with the Broad River. The presence of wetlands was a major consideration in remedy selection.

Site 3 is bounded to the northeast by a pond and to the southwest by the marshes. Topographically, the causeway is approximately 14 acres in size and 4,000 feet long and ranges from 150 to 225 feet wide and rises 11 to 15 feet above mean sea level.

The wastes existing at Site 3 are those now capped solid wastes, some of which contained or were contaminated by smaller amounts of oils or other liquids, sludges, pesticide residues, chlorinated solvents, mercury, beryllium, and polychlorinated biphenyls (PCBs). Because the landfill was constructed over many years, the actual volume of wastes deposited [ratio of fill dirt to wastes] is unknown and cannot be reasonably estimated.

Remedial Alternatives Evaluated for the Interim Remedy

The TtNUS (2000) Feasibility Study/Corrective Measures Study for Site/SWMU 3 – Causeway Landfill and the TtNUS (2000) Proposed Plan for Soil Interim Remedial Action at Site/SWMU 3 presented the following alternatives. Although the IRA has been completed, the text below reflects the alternatives as they were presented in the FS (TtNUS, 2000) and Proposed Plan for the IRA (TtNUS, 2000). Please see the 2000 Proposed Plan for further information.

No Action

- Alternative 1 – No Action: Evaluation of the no-action alternative is required by law as a basis for comparison with other alternatives. No remedial action would be taken to eliminate risks to human health and the environment. Concentrations of contaminants in soils may eventually be reduced to clean-up levels through natural attenuation processes but no monitoring would be performed to quantify this reduction.

Containment

- Each of the containment alternatives include roadway construction, bank stabilization, covering of site wastes, land use controls, and long-term monitoring. The alternatives differ in how much soil cover is placed and whether sediments will be further addressed.
- Alternative 2a – Partial Containment.
- Alternative 2b – Full Containment.
- Alternative 3a – Partial Containment with Further Sediment Evaluation.
- Modified Alternative 3a – Partial Containment with Further Sediment Evaluation: Alternative 3a is modified to include a minimum of 1 foot of soil cover over soils that present a moderate-risk to ecological receptors in lieu of only addressing high-risk soils.
- Alternative 3b – Full Containment with Further Sediment Evaluation.

Description Of The NCP Alternatives Analysis For The Interim Remedy

In the FS (TtNUS, 2000), each alternative was evaluated against the nine NCP criteria. A summary of the comparison of the Preferred Alternative to these criteria is provided in the *Preferred Final Remedy* Section. The Navy did not undertake another FS for the development of the final remedy, since the FFA parties (Navy, US EPA, and SCDHEC) agreed that the interim remedy should be adopted as the final remedy.

Scope and Role of This Action

MCRD Parris Island has thirty-seven (37) sites being investigated throughout the facility under the auspices of CERCLA and the Navy's Environmental Restoration (ER) Program. This Proposed Plan addresses only the final proposed remedy for Site 3. All remaining sites have been or are still in the process of being evaluated and addressed separately under the requirements of CERCLA, and to the extent practicable, the NCP.

A Federal Facilities Agreement (FFA) has been signed by the Navy, the U.S. EPA, and the SCDHEC for MCRD; the FFA became effective March 31, 2006. Copies of the FFA have been placed in the Administrative Record for the Site and the Information Repository located in the Beaufort County Library. Although the Team does not use Operating Unit (OU) language and references on a routine basis, U.S. EPA is tracking work with the CERCLIS database by OUs. The Site Management Plan (SMP) identifies Site 3 as OU3.

This proposed final remedy for Site 3 will play an important role in moving the ER program at MCRD Parris Island forward. Site 3 is one of the major CERCLA sites at this facility and extensive efforts by the MCRD Partnering Team have been devoted to achieving a remedy which will be protective of human health and the environment in both the short and long term.

What Are the Nine Evluation Criteria?

Threshold Criteria (The Selected Remedy Must Satisfy These Criteria):

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment.

Compliance with ARARs evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Balancing Criteria (These Criteria Are Used to Weigh the Relative Merits of the Alternatives):

Long-Term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-Term Effectiveness considers the length of time needed to implement an alternative and the risk the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

Modifying Criteria (These Criteria are also Considered During Remedy Selection and Incorporated into the ROD):

State/Support Agency Acceptance considers whether the state agrees with the Navy's analyses and recommendations, as detailed in the RI, FS, and Proposed Plan.

Community Acceptance considers whether the local community agrees with the Navy's analyses and Preferred Alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Summary of Site Risks—Sediment

Three months after the completion of the IRA, post-construction sediment sampling was performed to determine whether environmentally significant concentrations of contaminants remained in the exposed sediments. As part of this investigation, 20 sediment samples were collected at Site 3 (five samples collected on the marsh/southwestern side of the causeway and 15 collected in the pond/northeastern side) as shown on Figure 4.

Post-IRA Human Health Risks

Only the maximum concentration of arsenic [13.6 milligrams per kilogram (mg/kg)] exceeded a human health screening value (0.39 mg/kg). However, this concentration only slightly exceeded the arsenic background value of 12.2 mg/kg, indicating that this maximum concentration is likely the result of natural conditions. Furthermore, the average arsenic concentration found in Site 3 sediments (4.7 mg/kg) was less than the arsenic background value of 12.2 mg/kg. Because no other chemical concentration exceeded a human health screening criterion, all remaining uncapped Site 3 sediments were determined to not pose a threat to human health other than that generated by fish consumption (to be addressed by LUCs). Fish contamination is related to sediments and/or surface water.

While there were no other exceedances of human health screening values, detected concentrations of 4,4'-DDD, copper, lead, mercury, and zinc exceeded background/typical facility pesticide concentrations. Because fishing occurs in the 3rd Battalion Pond, numerical models were used to estimate the concentration in fish tissues. The modeled fish tissue concentrations were then compared to U.S. EPA Recommended Screening Values (RSVs) presented in Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories (U.S. EPA, 2000). For those compounds detected in the sediment that do not have RSVs, the Regional Screening Level calculator [Oak Ridge National Laboratory (ORNL), September 2009] and the appropriate exposure assumptions presented in U.S. EPA (2000) guidance were used to calculate the RSVs. These comparisons indicated that 4,4'-DDD, copper, mercury, and zinc posed a potential risk from consumption of fish tissue to some receptors based on modeled fish tissue concentrations. However, a consensus regarding inputs into the model was not attained by the Partnering Team. Therefore, to reduce the uncertainty from fish tissue modeling inputs, fish tissue samples were collected and analyzed (October 2009) to more fully evaluate risks to human health associated with consumption of fish from the 3rd Battalion Pond. The results from this sampling are discussed in the section *Summary of Site Risks – Fish Tissue*.

Post-IRA Ecological Risks

An ecological risk assessment was performed in May 2002 to determine risks to the environment posed by Site 3 sediment under post-construction conditions. For ecological receptors, potential impacts were considered for benthic macroinvertebrates (e.g., insect larvae) and aquatic receptors (e.g., mink, heron, mummichog, red drum, and osprey).

A "lines-of-evidence" analysis was used to further evaluate the extent of potential risks posed by residual site chemical concentrations. Based upon this evaluation, the ecological risk assessment concluded that residual chemical concentrations

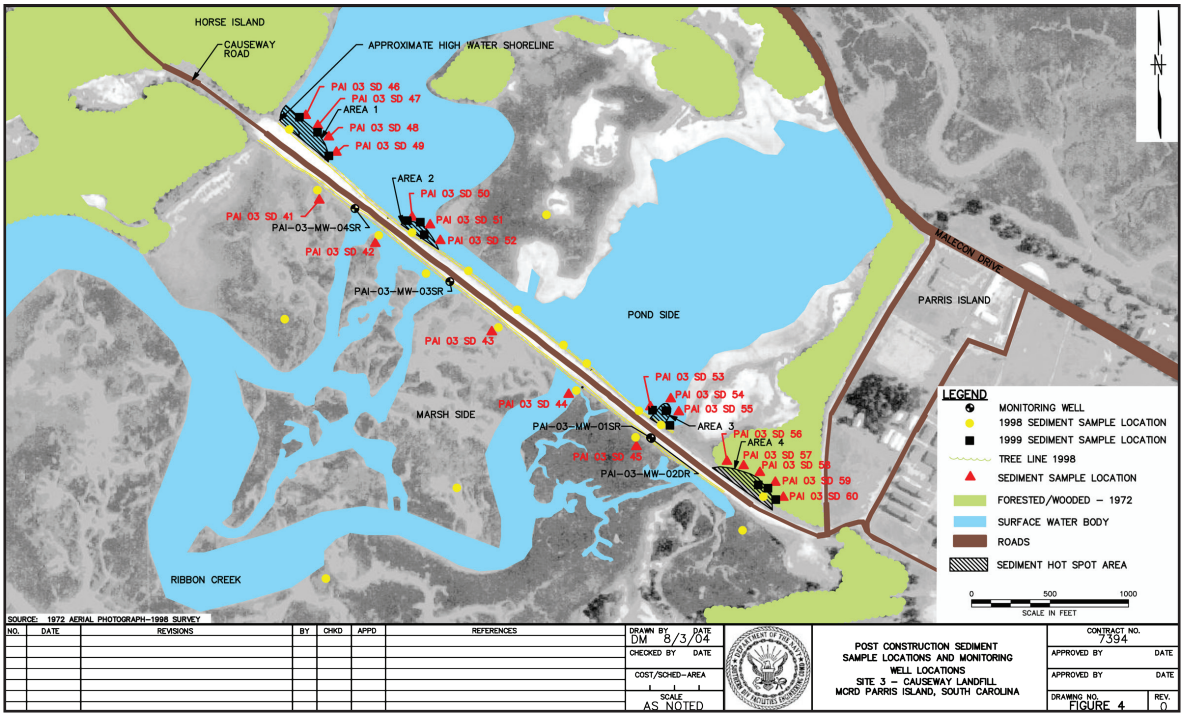

Figure 4: Post Construction Sediment Sample Locations and Monitoring Well Locations

found on the marsh side of the causeway and within Sediment Areas 1, 2, and 3 posed minimal risk to benthic invertebrates (e.g., insect larvae) and upper-level receptors (e.g., mink, osprey). However, it was determined that within the area just outside the cap at Sediment Area 4, concentrations of metals and pesticides could pose potential ecological risks. Thus, further sampling and data analysis was performed in Area 4.

In April 2003, three sediment samples were collected near the 2001 sediment sample PAI-03-SD-59 near Area 4 by a contractor retained by U.S. EPA. The locations of the sediment samples are shown on Figure 5. Samples were analyzed for mercury, lead, arsenic, DDD, DDE, and DDT.

Analytical test results indicated that two samples [PAI-03-SD-61-01 and PAI-03-SD-62-01] were in excess of ecological screening values (ESVs) for the pesticides DDE, DDD, and DDT. Another sample [PAI-03-SD-63-01], taken approximately 59 feet northeast of the causeway's riprap bank, had DDE, DDD, and DDT concentrations less than ESVs. Mercury, lead, and arsenic analysis of the three sediment samples indicated no exceedances of applicable sediment ESVs. Sediment analytical results exceeding such ESVs are illustrated in Figure 5.

Because all pesticide containing sediment samples which exceeded ESVs did so only slightly and all were significantly less than typical facility pesticide concentrations, the May 2002 quantitative numerical risk assessment was not further revised because, based on the ESV comparisons, a qualitative assessment was now adequate to indicate no remaining ecological risk from exposure to sediment.

Post-IRA Sediment Risk Conclusions

Although pre-IRA sediment concentrations indicated potential ecological risk, analysis of sediment after the IRA showed that chemical concentrations continue to decrease. After evaluation of the data, the determination was made that no unacceptable human health risk or ecological risk remained in the sediment at the 3rd Battalion Pond other than that generated by fish consumption (to be addressed by LUCs). The interim remedy which included capping waste on the landfill and adjacent sediments was designed to prevent migration of contaminants from the landfill and sediments. Therefore, a determination was made that no additional active remediation of sediments is necessary. Thus, the Navy has proposed No Action with respect to previously identified contaminated sediments lying outside of those sediment areas known as Areas 1, 2, 3, and 4.

Summary of Site Risks—Surface Water

An RFI/RI, encompassing both RCRA and CERCLA requirements, was conducted in 1998 and 1999 (TtNUS, November 1999). The RFI/RI field investigation was conducted from May 1998 to September 1998 and included sampling and analyses of 20 surface water samples in addition to soil, sediment, and groundwater samples. The field investigation also included a tidal study and aquifer tests and the establishment of background concentrations. Human health and ecological risk assessments were conducted for the surface water data collected as well as the other media sampled. The evaluation of surface water samples collected during the RFI/RI investigation was reviewed in the Technical Memorandum Post-Interim Construction Risk Assessment Site 3 – Causeway Landfill (Tetra Tech, 2010) and results indicated that human health and ecological risks posed by surface water COPCs were negligible, other than that generated by fish consumption (to be addressed by LUCs). The interim remedy, which included capping waste on the landfill and adjacent sediments, was designed to prevent migration of contaminants to the surface water. Therefore, a determination was made that no active remediation of surface water is necessary (Tetra Tech, 2010). Thus, the Navy has proposed No Action for surface water.

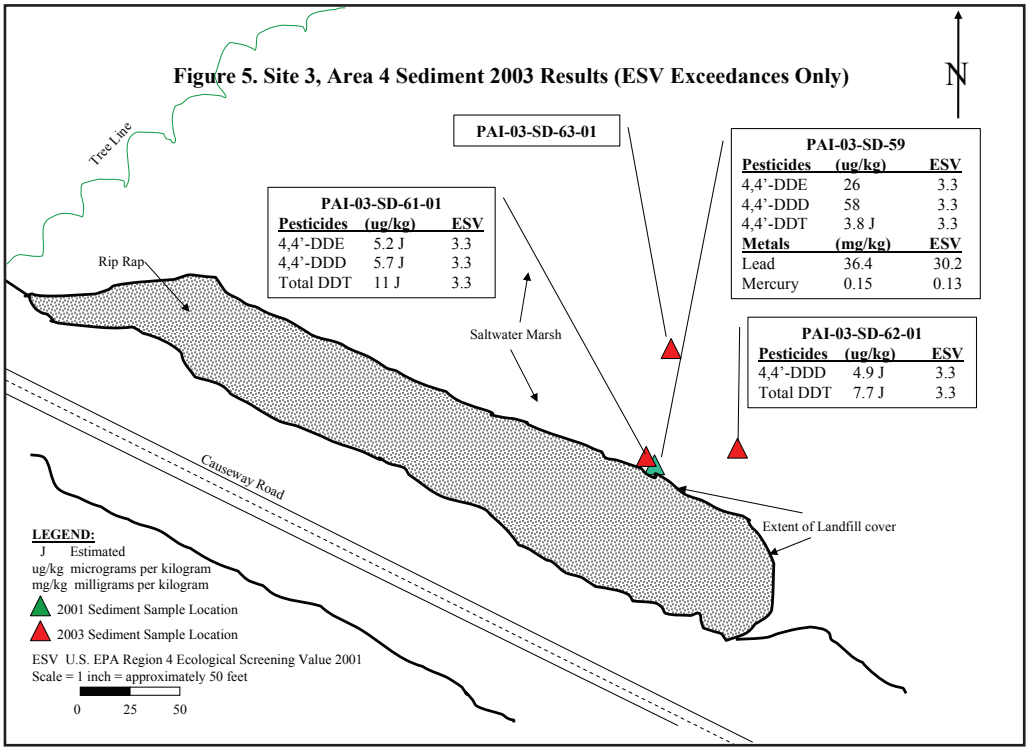

Figure 5: Site 3, Area 4 Sediment 2003 Results

Summary of Site Risks—Fish Tissue

As previously noted, certain species of game fish were collected in October 2009 from the 3rd Battalion Pond and fish tissues analyzed for certain chemicals for use in a HHRA. That effort was undertaken primarily because of both higher than background concentrations in sediments and the fact that one individual had been identified whom it appeared was engaged in subsistence fishing from various water bodies on the facility including the 3rd Battalion Pond. Collected fish tissues were analyzed for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dioxin-like PCB congeners, mercury, and copper.

Information collected during an interview conducted by MCRD personnel of the specific individual identified to the Partnering Team as a possible subsistence fisherman resulted in significant uncertainty regarding that individual's actual consumption level of fish from the 3rd Battalion Pond. This included, among other things, whether the level of consumption as may have occurred in the past was likely still occurring given a change in that individual's personal circumstances (i.e., recent employment). Nonetheless, the Partnering Team concluded that she could represent a "highly exposed individual" per U.S. EPA risk assessment guidance. Consequently, the Team decided to look to those rather more conservative ingestion rate assumptions found in U.S. EPA's Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories (U.S. EPA, 2000) to calculate potential human health risks for individuals who may be consuming fish from the 3rd Battalion Pond as part of the Site 3 HHRA. While reliance upon that particular guidance was not mandated by CERCLA, its use was deemed prudent by the Partnering Team to assess potential unacceptable human health risk scenarios from fish consumption possibly occurring at the 3rd Battalion Pond.

As is presented in the Navy's Technical Memorandum Post-Interim Construction Risk Assessment Site 3 – Causeway Landfill (Tetra Tech, 2010), the HHRA undertaken at Site 3 indicates that potential risks do exist to adult subsistence fishermen, child subsistence fishermen, child recreational fisherman, and U.S. EPA Region 4 default adult recreational fishermen. However, it was also found that those risks were/are similar to, but exceed, those calculated for the local reference location from which fish were also sampled.

Although unacceptable risks to the aforementioned receptors was identified, because exposure point concentrations for the dioxin-like PCBs (the primary risk drivers) did not exceed reference area concentrations by more than a factor of 2, it is possible that dioxin-like PCBs identified in fish at both the reference location and the 3rd Battalion Pond are anthropogenic background rather than that resulting from any Site 3 related release(s). However, potential unacceptable risks were still generated by COCs, including mercury, which were detected in sediments above background, and these COCs could not be eliminated from consideration based on reported waste disposal practices for the landfill. Therefore, the landfill cannot be eliminated as the source for these contaminants.

It is the Navy's current judgment that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Adoption Of The Interim Action as Final

Those actions comprising the documented interim remedy for Site 3 are summarized as follows:

- Placement of a Soil Cover – Up to 2 feet of soil was placed over the top and sides of the causeway to prevent human and ecological exposures to residual wastes and contaminated surface soils. A two-lane asphalt road was also constructed on top of the causeway.
- Stabilization and Erosion Control – The causeway was stabilized to prevent the sides of the causeway from eroding and possibly collapsing. Stabilization and erosion control was achieved by regrading, adding riprap, and planting vegetation along the sides of the causeway.
- Roadway Construction/Sediment Testing - A paved road has been constructed that will reduce precipitation infiltration into the waste and reduce erosion of cover material.
- Placement of Sediment Cover – The aforementioned more highly contaminated sediment areas (designated Areas 1, 2, 3, and 4) were covered with 1 foot of soil, a layer of cover fabric, and 1 foot of riprap to prevent future human and/or ecological exposures to residual contamination in sediments.
- Application of Land Use Controls – MCRD Parris Island has applied certain land use controls (LUCs) to the site in the form of prohibitions on: future residential uses; uncontrolled site excavations; swimming or wading in, or any subsistence fishing from, the 3rd Battalion Pond adjacent to the causeway; or extraction of site groundwater. The intention was that these restrictions prevent the creation of exposure pathways to residual contaminants of concern (COCs) in those surface soils and sediments placed beneath the landfill cover system. These conditions have been completed, implemented, or slightly modified. Signs are attached to all utility poles at Site 3 that state "Notice: No Digging. Contact NREO Ext. 3423 For Info" to prohibit any excavation, construction, or intrusive activity within the landfill unless authorized in advance by the MCRD environmental department and will remain. Separate signs will be posted prohibiting swimming or wading in the 3rd Battalion Pond adjacent to the causeway and access to the wetlands within 200 feet of the landfill's boundaries to ensure the prevention of intrusive activities to the sediment cover. The number, size, location and the language to appear on these sign(s) will be agreed upon by MCRD, U.S. EPA, and SCDHEC as part of a LUC RD.
- Monitoring of Landfill Cap integrity – Periodic monitoring will occur to ensure the integrity of the landfill cap including visual inspections. Monitoring will be in accordance with a Long Term Monitoring Work Plan (LTM WP) for Site 3 once developed and approved.

- Landfill Leachate Monitoring – Four monitoring wells which had been installed in 1998 to support the Navy's RI/RFI investigation were removed and abandoned in 2000 in preparation for IRA related site work. The wells were replaced with new wells in December 2001 because of the Navy's commitment in the IROD to monitor landfill leachate annually for at least five years. The new wells were placed on the shoulder of the asphalt roadway on the marsh side of the causeway in positions hydraulically down gradient from the landfill material. The wells have been monitored since early 2002. All leachate samples have been analyzed for Target Compound List (TCL) organic compounds and Target Analyte List (TAL) inorganic compounds. This condition has been implemented. Hazardous constituents will remain in leachate beneath capped waste materials. Monitoring wells inside the landfill will continue to be sampled to assess landfill integrity. Monitoring will be in accordance with a Long Term Monitoring Work Plan (LTM WP) for Site 3 once developed and approved.
- Re-characterization of sediment after implementation of the IRA (completed).

These actions have been completed and are serving to be protective of human health and the environment other than for fish consumption (to be addressed by LUCs).

Remedial Action Objectives

The IROD developed several Interim Remedial Action Objectives which included:

- Control human exposure (the existing maintenance worker, the future construction worker, and the recreational user) to chemicals of concern (COCs) in surface soil at concentrations in excess of remedial goal options (RGOs).
- Control exposure of ecological receptors to COCs in surface soil at concentrations greater than RGOs.
- Eliminate the migration of COCs from the fill material to sediment, surface water, and groundwater.
- Comply with chemical-specific, location-specific, and action-specific federal and state ARARs.

Additionally, the following RAO has been developed since the implementation of the IROD:

- Control human exposure to COCs in fish via consumption.

The Interim RAOs identified in the IROD have been met by the construction and maintenance of the landfill cap, as well, as the implementation of LUCs. These conditions have been evaluated in the aforementioned risk assessments. Therefore, these RAOs are being adopted as the final RAOs. An action in the form of a modified LUC is being taken to address the control of human exposure to COCs via fish consumption.

LUC Objectives

The follow LUC objectives will be achieved through implementation of the proposed final remedy:

- To prohibit unauthorized excavation, construction, or intrusive activities.
- To prohibit residential development of the Site. Prohibited uses shall include, but are not limited to any form of housing, child-care facilities, pre-schools, elementary and secondary schools, or playgrounds.
- To prohibit disturbance of the cover over marsh sediments.
- To prevent ingestion of contaminants in fish tissue.
- To prohibit the extraction or any use of the groundwater beneath the site.

Preferred Final Remedy

Why the U.S. Navy Recommends the Interim Remedy Modified Alternative 3a from the Feasibility Study

- After careful consideration and investigation, the Navy's recommended remediation for this site was the modified Alternative 3a. This remedy was recommended for the following reasons
- Minimizes human and ecological exposures to impacted surface soil where concentrations of contaminants represent human health ILCR greater than 1.0E-06 or moderate risk to terrestrial wildlife.
- Provides a minimum of 2 feet of soil cover over existing waste materials within the causeway structure, making it consistent with federal and South Carolina regulations.
- Stabilizes the sides of the causeway, eliminating further impact to the soils and sediments of the site.

The U.S. EPA and SCDHEC concurred with the preferred alternative. The preferred alternative was necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The preferred alternative satisfied the statutory requirements in CERCLA Section 121(b), which states that the selected alternative be protective of human health and the environment, comply with ARARs, be cost-effective, utilize permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfy the statutory preference for treatment as a principle element.

Comparison of the Preferred Soil Cleanup Alternative to NCP Criteria

In the FS (TtNUS, 2000) and Proposed Plan for the IRA (TtNUS, 2000), each alternative was evaluated against the nine NCP evaluation criteria. Although the IRA has been completed, this section includes a summary comparison of the modified 3a Alternative, the Preferred Alternative, to the nine NCP criteria.

- The Modified 3a alternative sufficiently protects human health and the environment by providing equal protection to maintenance and construction workers to the other containment alternatives and ranking in the middle of the containment alternatives for overall protectiveness of terrestrial wildlife.
- The Modified 3a alternative will comply or attain all chemical-, location- and action-specific ARARs/media clean-up standards in the long term.
- The Modified 3a alternative provides long-term effectiveness by including remedial components for preventing the migration of wastes.
- The Modified 3a alternative or other containment alternatives do not reduce the toxicity, mobility, or volume of the surface soil COCs other than any reduction that would result from biodegradation, natural dispersion, dilution, or other attenuating factors. The Presumptive Remedy for CERCLA Municipal Landfill Sites (U.S. EPA, 1993) establishes containment as the presumptive remedy for landfills similar in nature to Site/SWMU 3 because the volume and type of the waste in municipal landfills generally make treatment impracticable.
- Implementation of the Modified 3a alternative mitigated disturbances to the adjacent wetlands during bank stabilization and therefore, provides short-term effectiveness.
- The implementation of the modified 3a Alternative was technically and administratively feasible.
- The cost of the modified 3a Alternative was comparable with the other containment alternatives.
- State acceptance was achieved by SCDHEC concurrence with interim proposed remedy.
- Community acceptance was determined based on comments received during the public comment period for the Proposed Plan (TtNUS, 2000).

Components of the Proposed Final Remedy

The specific components of the proposed final remedy at Site 3 are as follows:

- **ADOPTION OF THE INTERIM REMEDIAL ACTION (IRA) AS FINAL (with modifications).** As discussed above in the section titled *Adoption of the Interim Action as Final*, the combined fill dirt, asphalt, cover fabric, riprap, and vegetative cover placed on site is successfully precluding unacceptable human and ecological exposures from capped wastes, surface soils, and sediments. Therefore, the interim remedy which has been adopted as final continues to satisfy the threshold criteria as required by CERCLA Section 121 and the NCP. MCRD will continue to visually monitor landfill cap integrity and collect and analyze landfill leachate samples to assess landfill integrity as well. The Navy's proposal adopts and incorporates the interim actions including LUCs as the final site remedy component for surface soils and sediments with the LUC modifications and additions bulleted below.
- **NO ACTION FOR SEDIMENTS.** Although pre-IRA sediment concentrations indicated potential ecological risk, analysis of sediment after the IRA showed that chemical concentrations continued to decrease. These investigations conducted since completion of the landfill's cover system demonstrate that there are no unacceptable human or ecological risks associated with residual contamination found in Sediment Areas 1, 2, 3, and 4 adjacent to the cap other than that generated by fish consumption (to be addressed by LUCs). Further details regarding site risks may be found in the *Summary of Site Risks* section of this document.
- **NO ACTION FOR SURFACE WATER.** The Site 3 Feasibility Study determined that capping of wastes, surface soils, and sediments should contain the source(s) of surface water contamination, which should result in a decrease in concentration of the contaminants in the surface water. No site-related risks to human health or the environment from surface water were identified during the RFI/RI and no risks should occur other than that generated by fish consumption (to be addressed by LUCs). Therefore, no additional remedy has been selected for surface water.
- **MAINTENANCE OF THE LANDFILL COVER.** Maintenance of the landfill will occur as agreed upon in a post-ROD document such as the remedial design (RD). Any erosion will be mitigated and measures such as removing woody vegetation will be implemented to ensure landfill integrity.
- **MODIFICATION OF LAND USE CONTROL - SIGNAGE.** The Navy is proposing to modify one of the LUCs previously applied to the site. This control (posted signs) should help preclude potential unacceptable human health exposures to known contamination. These current land use control signs located on the two piers at the 3rd Battalion Pond which currently state - "Notice: No Subsistence Fishing" will be replaced with signs that say the following: "MCRD Parris Island Notice: No Fishing." Additional information will be available if questions or comments are received.
- **ADDITION OF ADMINISTRATIVE LAND USE CONTROLS.** The Site 3 location and LUC boundaries, prohibitions against unauthorized excavation, construction or intrusive activities, fishing at the 3rd Battalion Pond, residential development or groundwater extraction or use (except as directed by SCDHEC or U.S. EPA for monitoring wells), and the requirement for MCRD environmental department approval of any such activities will be annotated in the installation's Environmental Management System. The Environmental Management System is a centralized tool for the dissemination of information critical to making appropriate decisions regarding the management of resources, compliance with environmental regulations and ensuring that site-specific

use limitations are complied with. This will include updating the Base Master Plan, installation's geographical information system (GIS) and any deed/lease restrictions in the event of property transfer. Site 3 LUCs will be included in a Depot Order currently under development governing ground disturbing activities across the facility.

The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. A LUC RD, as part of the Final Remedial Design or document memorializing Remedial Action Completion (primary documents under the FFA) that addresses how these LUCs will be implemented, maintained, monitored (including periodic inspections), enforced and reported on, will be prepared and submitted by the Navy per the approved Site Management Plan (SMP) schedule to U.S. EPA and SCDHEC for review and approval. Once the Final Remedial Design or document memorializing Remedial Action Completion (including the LUC RD) is approved by U.S. EPA and SCDHEC, it shall supersede any Land Use Control Implementation Plan (LUCIP) already developed for Site 3, as well as any conditions related to Site 3 LUCs in the LUC Memorandum of Agreement (also termed the Land Use Control Assurance Plan) executed between the Navy, U.S. EPA, and SCDHEC. As the actual LUCs are somewhat different than those stated in the LUCIP, the LUCIP will be superseded by the LUC RD after issuance of the final ROD.

Because hazardous substances will remain at the site above levels that allow for unlimited exposure and unrestricted use, the Navy will review the final remedial action no less than every five (5) years per CERCLA Section 121(c) and the NCP at 40 CFR300.4309f(4)(ii). If results of the five-year reviews reveal that remedy integrity is compromised and protection of human health is insufficient, then additional remedial actions will be evaluated by the Navy, U.S. EPA, and SCDHEC.

Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measures Study
COC	Contaminants of Concern
ER	Environmental Restoration
ESV	Ecological Screening Value
FFA	Federal Facilities Agreement
FS	Feasibility Study
HQ	Hazard Quotient
IRA	Interim Remedial Action
IROD	Interim Record of Decision
LUC	Land Use Control(s)
LUC RD	Land Use Control Remedial Design
MCRD	Marine Corps Recruit Depot
mg/kg	Milligrams per kilogram
NA	Not Available
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAEL	No-Observed-Adverse-Effect Level
NPL	National Priorities List
OU	Operating Unit
PCB	Polychlorinated Biphenyl
PRG	Preliminary Remediation Goal
PP	Proposed Plan
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RFI	RCRA Facility Investigation
RGO	Remedial Goal Option
RI	Remedial Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SMP	Site Management Plan
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TDS	Total Dissolved Solids
U.S. EPA	United States Environmental Protection Agency
ug/kg	Microgram per kilogram

Community Participation

State concurrence with the Preferred Alternative was obtained through the review and approval of documents in the Administrative Record file. Community acceptance will be determined through the publication of this Proposed Plan and solicitation of their input (including formal comments) during the public comment period. During the public comment period, the Navy, U.S. EPA, and SCDHEC welcome comments and/or suggestions on the Preferred Alternative.

What's a Formal Comment?

Formal comments are used to improve the Proposed Plan. To make a formal comment, you need to present your views during the public meeting or submit a written comment during the 60-day comment period. The public meeting will be held on March 15, 2011 at the Marine Corps Recruit Depot, Religious Ministries Center, Bldg. 854, Boulevard de France, Parris Island, SC 29905 starting at 6:30 PM. Written comments should be sent to

Commanding General
Marine Corps Recruit Depot
Attn: Lisa C. Donohoe, NREAO
P.O. Box 5028
Parris Island, SC 29905
Tel: 843-228-2779
email: lisa.donohoe@usmc.mil

AND

South Carolina Department of Health and Environmental Control
Attn: Richard Haynes, Division Director
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201
Tel: 803-896-4070
email: haynesra@dhec.sc.gov

The MCRD Parris Island and Navy will review the transcript of all comments received at the public meeting and all written comments received during the formal comment period before making a final decision. They will then prepare a written response to all comments. The transcript of comments and the MCRD Parris Island and Navy's written responses will then be issued in a document called the Community Responsiveness Summary, which is part of the ROD.

For More Detailed Information

To help the public understand and comment on the proposal for the site, this document summarizes a number of reports and studies. The technical and public information publications prepared to date for Site 3 are available at the following information repository:

Beaufort County Public Library Headquarters
311 Scott Street
Beaufort, South Carolina 29902

Marine Corps Recruit Depot, Parris Island
Site 3 (Proposed Plan)
Public Comment Sheet

Use this space to write your comments or to be included on the mailing list:

The MCRD Parris Island and the Navy want your written comments on the option under consideration for Site 3. You can use the form below to send written comments. If you have questions about how to comment, please call Lisa Donohoe at (843) 228-2779. This form is provided for your convenience. Please mail this form or additional sheets of written comments, postmarked no later than April 25, 2011, to

Commanding General
Marine Corps Recruit Depot
Attn: Lisa C. Donohoe, NREAO
P.O. Box 5028
Parris Island, SC 29905
Tel: 843-228-2779

email: lisa.donohoe@usmc.mil

AND

South Carolina Department of Health and Environmental Control
Attn: Richard Haynes, Division Director
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201
Tel: 803-896-4070

email: haynesra@dhec.sc.gov

(Attach sheets as needed)

Comment submitted by: _____

Mailing list additions, deletions, or changes

If you did not receive this through the mail or would like to

- ☐ be added to the site mailing list
- ☐ note a change of address
- ☐ be deleted from the mailing list
- ☐ obtain additional information concerning the Restoration Advisory Board

Name: _____

Address: _____

_____

_____

please check the appropriate box and fill in the correct address information above.